

33588US
Serial No. 08/956,082

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: James B. Kimble, Charles A. Drake, Jianhua Yao and
An-hsiang Wu

Serial No.: 08/956,082

Group Art Unit: 1764

Filed: October 23, 1997

Examiner: W. Griffin

For: CATALYST COMPOSITION COMPRISING ZINC COMPOUND OR
BORON COMPOUND AND HYDROCARBON CONVERSION PROCESS

DECLARATION UNDER 37 CFR 1.131

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

We, James B. Kimble, Charles A. Drake, Jianhua Yao and
An-hsiang Wu, do declare and say:

that we are the undersigned inventors of application Ser. No. 08/956,082,
filed October 23, 1997;

that USPN 5,883,034 substantially shows but does not claim the same
patentable invention as set out in the claims of application Ser. No. 08/956,082,
filed October 23, 1997;

that the invention set out in application Ser. No. 08/956,082 was completed
in this country before July 9, 1997, the effective filing date of application Ser. No.
890,540 which is the parent of the C.I.P. application that matured into USPN
5,883,034;

that the filing date of the present application, October 23, 1997, is less than a year after the filing of Ser. No. 890,540;

that attached hereto as Exhibit A is a "Patent Idea Record" of Phillips Petroleum Company (dates removed) signed by James B. Kimble, Charles A. Drake and Jianhua Yao showing the completion of part of the invention set out and claimed in application Ser. No. 08/956,082;

that attached hereto as Exhibit B is a "Patent Idea Record" of Phillips Petroleum Company (dates removed) signed by Charles A. Drake and An-hsiang Wu showing the completion of part of the invention set out and claimed in application Ser. No. 08/956,082;

that attached hereto as Exhibit C is a page from a laboratory notebook (dates removed) signed by Charles A. Drake verifying the steam treatment of the catalyst 37800-80-2 disclosed in Exhibit B;

that all the pertinent dates which have been removed from Exhibits A, 'B and C are prior to July 9, 1997;

further Declarants saith not;

We hereby declare that all statements made herein of our individual knowledge are true and that all statements made on information and belief are believed to be true; further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or

imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

James B Kimble
James B. Kimble

10/20/99
Date

Charles A Drake
Charles A. Drake

10/25/99
Date

Jianhua Yao
Jianhua Yao

10/20/99
Date

An-hsiang Wu
An-hsiang Wu

10/21/99
Date

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PATENT IDEA RECORD
PHILLIPS PETROLEUM COMPANY & SUBSIDIARIES

PATENT
DIVISION

EXHIBIT A

SUBJECT Zinc compound promoted 2SM-5 catalyst

3758-46-2

Please identify earlier recordings and/or discussions of this invention which you can recall: Drawing(s) _____ Notebook(or Diary) _____

Correspondence _____ Work(or purchase)order(s) _____ Discussions _____

Briefly describe the idea. Set forth its application, operation and novel features. A freehand sketch of the idea will be appreciated.

Is this patent idea in use? _____ If so, date of first usage _____ If not, are there any plans to use it? _____

If the patent idea is a solution to a problem, please state the problem, describe the idea, and indicate how the idea solves the problem.

In the converting hydrocarbon to BTX and olefins (C_6^+ + C_3^+) process, better economics is expected when the BTX + olefins yield and Olefins/BTX yield ratio are maximized.

It is also desired that the coke formation on the catalyst is very low in order to maintain the stability of catalyst. It is now found that by mixing 2SM-5 powder with Zinc compound powder (e.g. $ZrAlO_4$, $ZrTiO_3$, $ZrSiO_4$) and embedding them into SiO_2 matrix, then steaming the catalyst at $650^\circ C$ for 6 hr, the resulting catalysts showed higher BTX + olefin yield, higher Product value over gasoline, and much lower coke formation than commercial 2SM-5 catalyst. The example is shown below.

<u>Run #</u>	<u>Cat ID</u>	<u>Cat Description</u>	<u>Olefins+BTX (wt.%)</u>	<u>Olefin/BTX</u>	<u>Pr over gasoline(1b)</u>	<u>Coke formation (%/hr)</u>
3758-46-2	Zeocat	Commercial 2SM-5 catalyst	58.0	0.36	2.1	4.7
3758-79-2	3757-1b-2	$P_2O_5OH + ZrTiO_3 + SiO_2$ binder + 650°C steam	64.6	0.43	3.2	0.2
3758-84-2	3757-23-3	$P_2O_5OH + ZrSiO_4 + SiO_2$ binder + 650°C steam	60.8	0.51	3.1	0.2
3758-84-1	3757-23-2	$P_2O_5OH + ZrAlO_4 + SiO_2$ binder + 650°C steam	58.6	0.55	3.1	0.3
= 3758-82-2	3757-21-3	$P_2O_5OH + ZrTiO_3 + Al_2O_3$ binder + 650°C steam	60.0	0.50	3.0	1.5

VITNESS: P_2O_5OH : 2SM-5 powder

READ AND UNDERSTOOD BY:

John W. Miller

DATE

PLEASE SIGN AND DATE, AS
INDICATED, AND SUBMIT TO
PATENT DIVISION.

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R&I J. B. Knutle DATE 427494
(ONE GIVEN NAME/ONE INITIAL/LAST NAME) EMPLOYEE NO. R&D
 BUSINESS MAILING ADDRESS 370 A PL CITY Bartlesville GROUP/STAFF/SUBSIDIARY R&D
 R&I Charles A. Deeks DATE 232581
(ONE GIVEN NAME/ONE INITIAL/LAST NAME) EMPLOYEE NO. R&D
 BUSINESS MAILING ADDRESS 322 PL CITY Bartlesville GROUP/STAFF/SUBSIDIARY R&D
 R&I J. L. Jones DATE 503328
(ONE GIVEN NAME/ONE INITIAL/LAST NAME) EMPLOYEE NO. R&D
 BUSINESS MAILING ADDRESS 370 PL CITY Bartlesville GROUP/STAFF/SUBSIDIARY R&D

PATENT IDEA RECORD
PHILLIPS PETROLEUM COMPANY & SUBSIDIARIES

PATENT
DIVISION

SUBJECT Improved Aromatization Catalyst

EXHIBIT B

Please identify earlier recordings and/or discussions of this invention which you can recall: Drawing(s) _____ Notebook(Diary) _____

Correspondence _____ Work(purchase)Order(s) _____ Discussions _____

Briefly describe the idea. Set forth its application, operation and novel features. A freehand sketch of the idea will be appreciated.

Is this patent idea in use? _____ If so, date of first usage _____. If not, are there any plans to use it? _____

If the patent idea is a solution to a problem, please state the problem, describe the idea, and indicate how the idea solves the problem.

One of the goals of the FCC process is to maximize the yield of BTX while minimizing the amount of coke. It has previously been shown that incorporation of zinc silicate into a mixture of ZSM-5 and binder gives good yields of BTX while producing low amounts of coke. It has now been found that the addition of BaO₃ to such a catalyst gives an even higher yield of BTX and lower coke as shown below:

Run No	Cat No	Cat Description	Refin Yield	BTX Yield	% Coke
1802404	37800-S0-1	PZ+Ludox+Znsilicate	21.3	40.5	0.26
180482-6	37800-S0-2	PZ+Ludox+Znsilicate + BaO ₃	18.8	44.4	0.17

WITNESS:

READ AND UNDERSTOOD BY:

John W Miller RPL DATE _____

SIGNATURE OF INVENTOR(S):

Charles A Deuel, 232581 DATE _____
(ONE GIVEN NAME/ONE INITIAL/LAST NAME) EMPLOYEE NO. _____

BUSINESS MAILING ADDRESS: Bl Pl, Belle, CITY _____ GROUP/STAFF/SUBSIDIARY _____
(ONE GIVEN NAME/ONE INITIAL/LAST NAME) EMPLOYEE NO. _____

An- Mary M, 742643 DATE _____
(ONE GIVEN NAME/ONE INITIAL/LAST NAME) EMPLOYEE NO. _____

BUSINESS MAILING ADDRESS: 333 A Pl, CITY _____ GROUP/STAFF/SUBSIDIARY _____
(ONE GIVEN NAME/ONE INITIAL/LAST NAME) EMPLOYEE NO. _____

PLEASE SIGN AND DATE AS INDICATED, AND SUBMIT TO PATENT DIVISION.

19574

FORM 7248-S 8-64

RC - R&D - PATENT DIVISION

1/2 Catalyst Prepn -

1800-80-1

EXHIBIT C

Prepare solid mixture of 20g Zeocat,
0.4g zincato silicate and enough
Ludox to make paste - ~~granulate~~ dry -
Steam 650C/4 hrs - 160g/140g

1800-80-2 Catalyst #

Prepare mixture of 20g Zeocat, 0.4g zinc
o-phenoxide, 0.4g basic aliph and enough
Ludox to make paste - ~~granulate~~ dry
Steam 650C/4 hrs - 200g/140g

1800-80-3 - Prepare mixture of 20g Zeocat
powder and 5g Silica gel 4-20 μ - 21
Add H2O to make paste - ~~granulate~~
dry - calcine 500C/3 hr
200g/140g